

What is claimed is:

1. A horizontal reaction chamber for incorporating small gas bubbles into a liquid comprising:

- (A) an inlet for receiving a gas/liquid mixture,
- (B) a plurality of nested and concentric tubes each having essentially the same length, including an innermost tube and an outermost tube,
- (C) a physical barrier between each pair of adjacent tubes extending along the length of the tubes, wherein the physical barriers are generally co-linear with each other, and
- (D) means for securing the position of the tubes;

wherein each of the concentric tubes contains an opening along its length such that the openings in adjacent tubes are proximal to the physical barrier between the adjacent tubes and are on alternate sides of the barrier such that flow in adjacent tubes occurs in opposite circumferential directions, and the innermost tube comprises an outlet.

2. A horizontal reaction chamber as in claim 1, wherein the physical barrier comprises a bolt.

3. A horizontal reaction chamber as in claim 1, wherein the physical barrier comprises resin or other similar chemical composition.

4. A horizontal reaction chamber as in claim 1, wherein the openings in the tubes are located at most 30° away from the physical barriers.

5. A horizontal reaction chamber as in claim 4, wherein the openings in the tubes are located approximately 10° away from the physical barriers.

6. A horizontal reaction chamber as in claim 1, wherein the openings comprise a series of small orifices along the length of each of the tubes.

7. A horizontal reaction chamber as in claim 6, wherein the small orifices are spaced substantially equidistant from each other.
8. A horizontal reaction chamber as in claim 1, wherein the openings comprise slits.
9. A horizontal reaction chamber as in claim 1, further comprising an end plate on one end of the chamber.
10. A horizontal reaction chamber as in claim 1 which can be retrofitted into an existing protein removal system.
11. A protein removal system for removing organic waste from contaminated water comprising:
  - (A) an injector for providing the contaminated water,
  - (B) an eductor for providing gas into the contaminated water,
  - (C) a manifold comprising a plurality of ports for dispersing the contaminated water containing gas,
  - (D) a horizontal reaction chamber for creating small bubbles of the gas in the contaminated water comprising:
    - (1) a plurality of inlets corresponding to the plurality of ports on the manifold,
    - (2) a set of nested, concentric tubes each having essentially the same length including an innermost tube,
    - (3) a physical barrier between each pair of adjacent tubes extending along the length of the tubes, wherein the physical barriers are generally co-linear with each other, and
    - (4) means for securing the position of the tubes relative to each other;

wherein each of the concentric tubes contains an opening along its length such that the openings in adjacent tubes are proximal to the physical barrier between the adjacent tubes and are on alternate sides of

- the barrier such that flow in adjacent tubes occurs in opposite circumferential directions, and the innermost tube comprises an outlet, and
- (E) a foam collection chamber which receives the contaminated water comprising the small gas bubbles from the outlet of the horizontal reaction chamber, comprising:
- (1) a foam riser for collecting foam from the top of the foam collection chamber,
  - (2) a tube or pipe for allowing purified water to exit the foam collection chamber.
12. A protein removal system as in claim 11, further comprising an end plate capping one end of the horizontal reaction chamber.
13. A protein removal system as in claim 11, wherein the openings comprise small orifices spaced substantially equidistant from each other along the length of each of the tubes.
14. A protein removal system as in claim 11, wherein multiple horizontal reaction chambers are attached to the foam collection chamber.
15. A protein removal system as in claim 11, wherein the horizontal reaction chamber is attached to the foam collection chamber using a flange and flange bolts.
16. A protein removal system as in claim 15 that is comprised of easily assembled sections that can be assembled in place.
17. A method for removing organic waste from a contaminated water source containing organic-loaded water, such as aquarium tanks, lagoons, effluent from agricultural applications, wastewater, or other water sources, comprising the steps of:
- (A) mixing the contaminated water with gas,
  - (B) providing a horizontal reaction chamber for creating small bubbles of the gas in the contaminated water comprising:

- (1) an inlet for the contaminated water and gas mixture,
- (2) a set of nested, concentric tubes each having essentially the same length including an innermost tube and an outermost tube,
- (3) a physical barrier between each pair of adjacent tubes extending along the length of the tubes, wherein the physical barriers are generally co-linear with each other,
- (4) means for securing the position of the tubes relative to each other, and
- (5) an end plate capping one end of the chamber;

wherein each of the concentric tubes contains an opening along its length such that the openings in adjacent tubes are proximal to the physical barrier between the adjacent tubes and are on alternate sides of the barrier such that flow in adjacent tubes occurs in opposite circumferential directions, and the innermost tube comprises an outlet directed to a collection chamber; and

- (C) introducing the mixture of contaminated water and gas into the inlet of the horizontal reaction chamber so that the reaction chamber creates a high concentration of small gas bubbles in the contaminated water resulting in a foam,
- (D) collecting the foam from the outlet in the collection chamber and disposing of it, and
- (E) collecting purified water through a tube or pipe exiting the collection chamber.